JOB HAZARD ANALYSIS (JHA)		Date: **05-31-05**	**X** New JHA Revised JHA
Organization/Park Unit: **National Interagency Template**	Division: **Wildland Fire**	Branch: **N/A**	Location: **United States**
JOB TITLE: **Working in the Vicinity of Hazard Trees**		JHA Number: **2005-01**	Page **1** of **6**
Job Performed By: **Wildland Fire Personnel**	Analysis By: **Interagency Task Group**	Supervisor:	Concurred By: **Federal Fire and Aviation Safety Team (FFAST)**

Required Standards:	**Interagency Standards for Fire and Fire Aviation Operations; Fireline Handbook; Incident Response Pocket Guide; Class A,B,C Faller Task Book. [Applicable agency specific standards must also be referenced. Examples include the Wildland Fire and Aviation Program Management and Operations Guide for the Bureau of Indian Affairs, the Health and Safety Code Handbook for the USDA-Forest Service and the Chainsaw Operator Training and Certification Policy for the Bureau of Land Management, Oregon State Office.]**
General Notes:	**The intent of this JHA is to serve as a template for field units to prepare local hazard tree JHAs that would be included with activity based JHAs for chain saw/cross cut saw operations, fire suppression, prescribed fire operations and other wildland fire related work activities. JHAs are most effective when they are project specific and are prepared at the local level by personnel who will be implementing the project. As a result, this example JHA should be modified as necessary to meet the specific work conditions and requirements of the local unit. This JHA only identifies the hazards and safe actions associated with working in the vicinity of potential hazard trees and specific hazard trees that have been identified. It does not analyze the other hazards associated with the work activity.**
Required Personal Protective Equipment:	**Wear agency approved hard hats whenever working in forested environments. Utilize all wildland fire PPE when performing wildland and prescribed operations, or as otherwise required. These include boots, fire shelter, hard hat, goggles/safety glasses, yellow aramid shirts, aramid trousers and leather gloves. Personnel who are exposed to noise levels in excess of 85 decibels, such as chain saw operators, are required to utilize ear plugs/hearing protection. In addition, all chain saw operators must wear chain saw chaps.** **Additional PPE may be required by local conditions, material safety data sheets and/or JHAs. See the Interagency Standards for Fire and Fire Aviation Operations for additional information.**
Tools and Equipment:	**Wildland fire hand tools (shovel, pulaski, etc.), chain saws/cross cut saws, saw service/repair kits, fuel and bar oil containers, axes and wedges, flagging, handheld radios, spare batteries for radios, first aid kits.** **For the sake of brevity, throughout the remainder of this JHA the term "chain saw" is used to refer to "chain saws and/or cross cut saws" unless otherwise specified.**

Activity/Sequence of Job Steps	Potential Hazards/ Injury sources	Safe Action or Procedure
Pre-work/Preseason Activities	**None**	**Where applicable and available, contact local agency foresters, unit resource management specialists, USDA-Forest Service, Forest Health Protection Offices, etc. to:** **1. Identify high risk tree species in your particular area. These are generally trees that are more susceptible to heart rot, root rot or have shallow roots.** **2. Where information is available, identify geographic areas where high concentrations of potential hazard trees are likely to exist.** **3. Where information is available, obtain updates on current forest health trends and problems areas in your vicinity.**
Refresher Training	**None**	**1. During annual wildland fire and chain saw operator refresher training, provide updates, as available on current forest health trends and problem areas in the local area.**

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		2. Brief employees on recognition of hazard tree indicators, use of assessment techniques and appropriate risk mitigation measures. An excellent reference for hazard tree information is found at: http://www.fs.fed.us/r1/projects/haztree_index.shtml. Check for websites that contain regional specific information such as http://www.fs.fed.us/r5/spf/publications/fhp-pp-presentations.shtml for California.
Pre-work Briefing/Tailgate Safety Session	**None**	**1. Brief employees on work assignment and objectives. 2. Insure required PPE is being utilized. 3. Review applicable JHAs, Material Safety Data Sheets (MSDS), hazard tree indicators and mitigation measures including LCES (lookouts, communications, escape routes and safety zones). Refer to attachment at end of this JHA. 4. Provide information on environmental conditions and forecasts (such as strong and/or gusty winds) that could affect hazard tree risks. 5. Identify trigger points/decision points as warranted for conditions such as strong winds. 6. Brief employees on the plan that would be executed in the event of a serious employee illness/injury that would require medical evacuation.**
Size-up of Worksite Conditions	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Maintain situational awareness and utilize the risk management process. Refer to the Incident Response Pocket Guide or the Fireline Handbook for a description of the risk management process. 2. Look up, down and all around for hazard tree indicators and high risk tree species. Refer to attachment at the end of this JHA. 3. Pay particular attention to burning trees and trees with dead or broken tops, dead or broken limbs, hung-up trees, trees with severe leans and other signs of significant weakness. 4. Stay alert for environmental conditions that could increase hazard tree risks. These include strong/gusty winds, steep slopes and obscured visibility (such as smoke or limited daylight) that inhibits visibility of tree tops. 5. Tree felling at night should be avoided whenever possible and should only occur when there is adequate lighting and the entire tree including the tree top and surrounding area can be seen by the faller. [Follow agency policy if the agency has established more stringent requirements. Forest Service employees should refer to the Health & Safety Code Handbook.] 6. Communicate hazards to crew members, implement LCES and other hazard control measures.**

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Locating Fireline	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Utilize the most qualified personnel on scene to scout and flag fireline.** **2. Locate fireline in areas with the least amount of potential hazard trees, as long as other fireline safety risks are not increased to an unacceptable level.** **3. Perform an initial size-up of potential hazard trees from a safe distance as determined by an assessment of on site conditions such as steepness of slope, number and density of trees in vicinity and potential for "domino effect", stability of trees, wind conditions and other applicable variables. [Follow agency policy if the agency has established more stringent requirements. Forest Service employees should refer to the Health & Safety Code Handbook.] Approach trees as warranted to conduct additional assessment.** **4. Insure LCES is in place when conducting the assessment in close proximity to potential hazard trees. Assess potential hazard trees to determine if a live tree or snag should be identified as a hazardous tree. Refer to assessment techniques in the attachment at end of this JHA.** **5. Flag or otherwise mark all identified hazard trees.**
Fireline Construction	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Mitigating the risks of identified hazard trees will precede line construction. Mitigation may be accomplished by avoiding, felling or eliminating through other means (blasting, burning, heavy equipment, etc.).** **2. All personnel other than the faller, and the swamper if necessary, will keep a safe distance away from identified hazard trees. [Follow agency policy if agency has established more stringent requirements. Forest Service employees should refer to the Health & Code Handbook.]** **3. The safe distance will be determined by an assessment of on site conditions. As an example, the safe distance in flat terrain for one isolated snag in a brush field with no potential for a "domino effect" may be 1 tree length. In contrast, the safe distance on the down slope side of a large dense snag patch on very steep slopes may be in excess of 5 tree lengths. [Follow agency policy if the agency has established more stringent requirements. Forest Service employees should refer to the Health & Safety Code Handbook.]** **4. If the identified hazard tree cannot be safely removed, the area will be flagged off and fire personnel in the area will be notified to avoid the area.**

Activity/Sequence of Job Steps	Potential Hazards/ Injury sources	Safe Action or Procedure
		5. If dozers or other heavy equipment are assigned to fireline construction, personnel will stay a safe distance away as determined by an assessment on onsite conditions. **6. Continue to maintain situational awareness and utilize LCES and the risk management process.**
Falling Hazard Trees	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Fallers have the responsibility to say "NO" and walk away from any situation they determine to be an unacceptable risk.** **2. Avoid felling trees during high or gusty winds, when lightning activity is occurring or if visibility of tree tops and surrounding area is obscured by darkness, smoke, fog or other conditions.** **3. Limit personnel at the base of the tree to the feller, certified for the appropriate size class, and the swamper when necessary. [Follow agency policy if the agency has established more stringent requirements. Forest Service employees should refer to the Health & Safety Code Handbook.]** **4. Implement LCES. Identify swamper, and as necessary, other personnel as lookouts. Confirm clear communications. Pre-identify multiple escape routes and safety zones.** **5. Size up the tree considering the tree species, height, diameter, lean, soundness, previous fire damage, fire currently in tree, split or broken top, "widow makers" and other hazard tree indicators. Bore tree if necessary to determine soundness.** **6. Clear escape routes and work area. Walk out and clear the intended lay.** **7. Fell tree using established falling procedures. Refer to faller Task Books, other applicable JHAs and any agency specific requirements.** **8. As tree begins to fall, watch top and move quickly away. If tree movement compromises the primary safety zone, use an alternate.** **9. Watch for falling tree tops and limbs for at least 30 seconds after tree hits the ground.**
Mop-up	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Perform an initial size-up of potential hazard trees from a safe distance as determined by an assessment of on site conditions such as steepness of slope, number and density of trees in vicinity and potential for "domino effect", stability of trees, wind conditions and other applicable variables. [Follow agency policy if more stringent requirements have been established.] Approach trees as warranted to conduct additional assessment.**

Activity/Sequence of Job Steps	Potential Hazards/ Injury sources	Safe Action or Procedure
		2. Insure LCES is in place when conducting the assessment in close proximity to potential hazard trees. Assess potential hazard trees to determine if a live tree or snag should be identified as a hazardous tree. Refer to assessment techniques in the attachment at end of this JHA. **3. Flag or otherwise mark all identified hazard trees.** **4. Conduct risk assessment of the need to mop-up to meet fire control objectives versus the hazards associated with felling the hazard trees and conducting mop-up operations.** **5. Mitigating the risks of identified hazard trees will precede mop-up work. Mitigation may be accomplished by avoiding, felling or eliminating through other means (blasting, burning, heavy equipment, etc.).** **6. All personnel other than the faller (certified at the appropriate class) and, if necessary, the swamper will keep a safe distance away from identified hazard trees. [Follow agency policy if more stringent requirements have been established.]** **7. If the identified hazard tree cannot be safely removed, the area will be flagged off and fire personnel in the area will be notified to avoid the area.** **8. Continue to maintain situational awareness and utilize LCES.**
ICP, Camps, and Other Comparable Temporary Facilities	**Struck by falling tree, tree limbs or other debris from tree.**	**1. Potential hazard trees in and around ICPs, camps and sleeping areas must be assessed. Refer to hazard tree indicators and assessment process identified in other sections of this JHA.** **2. Identified hazard trees will be mitigated prior to use of the area for camps and other temporary fire facilities.** **3. If identified hazard trees cannot be safely felled or otherwise eliminated, the temporary facility will be reconfigured in such a manner that all personnel will be located a safe distance away from identified hazard trees. [Follow agency policy if more stringent requirements have been established.] Flag off or otherwise prevent entry to locations where the identified hazard trees may fall and notify all personnel of the "hazard – no entry areas".**

Potential Hazard Tree Indicators

NOTE: Trees with the indicators below are not all highly hazardous but should be carefully examined to assess the danger.

Indicators – Entire Tree
- Snags – standing dead tree or part of dead tree
- Moderate to severe lean (especially recent)

Crown Indicators
- Loss of needles & leaves
- Discoloration/dieback
- Thinning crown
- Stressed cone crop

Limb Indicators
- Dead/cracked/broken branches
- Fallen limbs on ground
- Rot or conks
- Cavities and cankers
- Mistletoe branches

Bole, Stem, Butt Indicators
- Dead/broken tops
- Forked/multiple tops
- Bole swelling
- Cracks or splits
- Cavities and cankers
- Rot or conks
- Wounds/damage – mechanical or fire
- Loose bark

Root & Tree Base Indicators
- Sprung roots – mounded soil or exposed roots
- Compaction & erosion
- Damage from previous fire(s)
- Wind-throw
- Basil resin flow
- Rot or conks
- Cracks or splits

Other Indicators
- Smoke or fire is visible in tree
- Area experiencing insect and/or disease infestations

Assessment Techniques – Potential Hazard Trees

NOTE: Potential hazard trees should be carefully inspected from top to bottom, including soil next to base of the tree. The assessment must include all sides (360°) of tree. Binoculars can aid in evaluating indicators higher in the tree. Much of hazard tree assessment is subjective and dependent on the skill level and experience of the inspector.

- Look for indicators of hazard and assess the degree of severity. Consider severity versus probability.
- Try to determine if decay or rot is associated with the hazard indicators, which makes failure more likely.
- Thump, bore, and dig as needed to assess conditions not immediately visible.
- Striking bole with a solid object (such as flat end of axe) will aid in hearing the hollow sound of a tree with advanced decay. Boring a tree will also reveal how sound the wood is.
- Digging around the roots may reveal if they are green & sound or are they dead, rotten, burned off or otherwise damaged.
- Evaluate wind (especially wind speed and variability in wind direction)
- What other safety hazards exist (uncontrolled fire, steep slopes, obscured visibility, aviation operations, power lines, etc.)?

Risk Mitigation Measures – Identified Hazard Trees

- Utilize LCES (Lookouts, Communications, Escape Routes & Safety Zones) whenever working in the vicinity of hazard trees.
- Eliminate identified hazard trees (consider all techniques such as saw, burn, blast, cable, heavy equipment).
- Use traffic control when felling trees in the vicinity of roads, trails, firelines, etc.
- Ensure that felling operations do not endanger nearby workers. Avoid working down slope of felling activities.
- If unable to eliminate an identified hazard tree, it should be flagged and avoided.
- Identified hazard trees that can't be eliminated must be communicated to all other employees working in the area.
- Reassess situation as conditions change.

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